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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,949	07/06/2001	Naohiro Hirose	250602US40PCT	5351
22850 7590 04/17/2009 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER CHAMBLISS, ALONZO	
			ART UNIT 2892	PAPER NUMBER
			NOTIFICATION DATE 04/17/2009	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 09/830,949	<b>Applicant(s)</b> HIROSE, NAOHIRO	
	<b>Examiner</b> Alonzo Chambliss	<b>Art Unit</b> 2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 90-132 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 90-132 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/30/08</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments with respect to claims 1 and 90-132 have been considered but are moot in view of the new ground(s) of rejection.

### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/23/09 has been entered.

### ***Information Disclosure Statement***

3. The information disclosure statement (IDS) submitted on 12/30/08 was filed before the mailing date of the non-final rejection on 4/5/09. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 90-96, 100-110, 113-115, 117-129, 131, and 132 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seyama et al. (US 5,586,006) in view of Hwang et al.. (US 5,912,210).

With respect to Claims 1, 103, 116, 117-121, and 124, Seyama discloses an outermost interlayer resin insulating layer 32B-4 (i.e. epoxy resin). A pad structure 32A-5 (i.e. having a plane layer) formed on the outermost interlayer resin insulating layer 32B-4. A solder resist 32B-5 (i.e. protective insulating layer) formed on the outermost interlayer resin insulating layer 32B-4 and the pad structure 32A-5, wherein the solder resist 32B-5 has an opening exposing a partially exposed portion of the pad structure 32A-5. A conductive connecting pin 34 configured to establish an electrical connection with another substrate 18. The conductive connecting pin 34 being secured to the partially exposed portion of the pad structure 32A-5 via a solder 38. A via hole formed through the outermost interlayer resin insulating layer 32B-4 and configured to electrically connect the pad structure 32A-5 to at least one conductive circuit 32A-4 formed below the outermost interlayer resin insulating layer 32B-4, the via hole being positioned directly below the pad structure 32A-5 (see col. 4 lines 1-67 and col. 5 lines 1-15; Figs. 4 and 5). Seyama fails to disclose a plurality of metal layer formed in the partially exposed portion of the pad structure. Hwang discloses a plurality of metal layer 26, 40 formed in the partially exposed portion of the pad structure 21 (see col. 4 lines - 10; Fig. 1). Thus, Seyama and Hwang have substantially the same environment of a

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pin electrically connected to a pad on substrate by a solder material. Therefore, one skilled in the art at the time of the invention would readily recognize incorporating at least one metal layer between the pin and pad structure of Seyama, since the at least one metal layer would improve the electrical connection while creating a strong bond between the external connection structure and the pad structure as taught by Hwang.

With respect to Claims 90, 104, and 125, Seyama discloses at least one conductor layer comprising a plurality of conductor circuits 32A-3, 32A-2, and 32A-1 formed below the outermost interlayer resin insulating layer. At least one interlayer resin insulating layer is formed below the conductor layer wherein the conductor layer and the interlayer resin insulating layer are alternately formed (see Fig. 5).

With respect to Claims 91-93 and 105-107, Seyama discloses wherein the pad structure comprises an outermost conductor portion (i.e. the pad has an outermost conductor portion that is exposed and an innermost conductor portion inner of the pad) formed on the outermost interlayer resin insulating layer and the at least one conductor circuit is positioned directly below the pad structure (see Figs. 4 and 5).

With respect to Claims 94, 108, and 126, Seyama discloses at least one lower via hole directly connected to the via hole and formed through the at least one interlayer resin insulating layer formed below the conductor layer, the at least one lower via hole being configured to electrically connect the via hole to at least one of the conductor circuits in the at least one conductor layer (see Fig. 5).

With respect to Claims 95, 109, and 127, Seyama discloses wherein the pad structure comprises a plane layer (see Fig. 5).

With respect to Claims 96, 110, and 128, Seyama discloses a signal line (i.e. located attached to bump 40) formed on the outermost interlayer resin insulating layer, wherein the signal line electrically connects to the pad structure by circuit layers 32A-2 and 32A-3. The signal line is partially covered with the solder resist (see Fig. 5).

With respect to Claims 97, 111, and 129, Seyama discloses the claimed invention except for a diameter of the pad structure is 1.02 times to 100 times a diameter of the opening. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the diameter of the pad of Seyama between 1.02 times to 100 times the diameter of the opening, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Allen, 105 USPQ 233.

With respect to Claims 100-102, 113-115, 131, and 132, it is inherent feature that the pad structure has a roughened surface since the pad is made of metal, which would have some level of roughness.

With respect to Claims 122 and 123, it is inherent that the one metal layer of Hwang is formed in the partially exposed portion of the pad structure after the opening is formed in the solder resist since a hole has to be present in order for the metal layer to be in the hole and in contact with the pad structure.

6. Claim 98, 112, and 130 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seyama et al. (US 5,586,006) and Hwang et al. (US 5,912,510) as

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applied to claims 1, 103, and 124 above, and further in view of Ainslie et al. (US 4,418,857).

With respect to Claims 98, 112, and 130, Seyama-Hwang discloses the claimed invention except for the pin made of Cu. However, Ainslie discloses a pin made of Cu (see col. 4 lines 20-25. Thus, Seyama-Hwang and Ainslie have substantially the same environment of a pin connected to a metal layer of a substrate. Therefore, one skilled in the art at the time of the invention would readily recognize incorporating copper for the material of the pin of Seyama-Hwang, since the copper would provide a reliable material for electrical connection between the substrate and external device as taught by Ainslie.

7. Claim 99 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seyama et al. (US 5,586,006), Hwang et al. (US 5,912,510), and Ainslie et al. (US 4,418,857) as applied to claims 1 and 98 above, and further in view of Watanabe (JP 58-030175).

With respect to Claim 99, Seyama-Hwang-Ainslie discloses the claimed invention except for a columnar connection portion has constriction portion having a diameter, which is smaller than the diameter of the other portions. However, Watanabe discloses disclose wherein the columnar connection portion 6 has constriction portion 601 having a diameter, which is smaller than the diameter of the other portions (see English abstract and Fig. 2). Thus, Seyama-Hwang-Ainslie and Watanabe have substantially the same environment of a pin attached to a substrate. Therefore, one skilled in the art at the time of the invention would readily recognize incorporating a constriction portion on the pin of Seyama-Hwang-Ainslie, since the constriction portion would connection between the substrate and an external device as taught by Watanabe.

The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

***Conclusion***

8. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (571) 272-1927.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao Le can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system see <http://pair-dkect.uspto.gov>. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or [EBC\\_Support@uspto.gov](mailto:EBC_Support@uspto.gov).

**AC**/April 5, 2009

/Alonzo Chambliss/  
Primary Examiner, Art Unit 2892